DEVELOPMENT OF A CERTIFICATION PROGRAM FOR HAZARDOUS MATERIALS INSPECTORS

EXECUTIVE DEVELOPMENT

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ABSTRACT

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The problem identified for this research project is that the Orange County Fire Authority (OCFA) has had difficulty in recruiting and retaining a contingent of trained and competent fire inspectors. Many of the more competent inspectors were hired by other fire departments with better compensation packages, while some of the less knowledgeable and skilled inspectors were terminated or required excessive oversight by their supervisors. The purpose of this study was to develop a certification standard for the specialized inspectors in the Hazardous Materials Services Section (HMSS). Attainment of the certification would entitle the inspector to 5 % incentive pay while assigned to HMSS. I chose the action research method in order to meet the goal of developing the hazardous materials certification standard by a deadline which had been determined by the OCFA's Executive Management during contract negotiations. Three research questions were addressed for the study:

1. What are the particular skill sets required for fire inspector staff assigned to the HMSS?
2. What classes, training, and/or tests should be required as a demonstration that the inspector has acquired the necessary skills?
3. Should there be a requirement for the inspector to re-certify that they have the particular skills, and if so, what should be required?

Procedures to complete the study included a review of literature at the National Fire Academy, the University of California at Irvine, the Orange County Fire Authority, the Internet, and by means of personal contacts of resources identified at these sources. I participated as a project manager of a task

force of OCFA staff which was tasked to review inspector job specifications, develop a job task analysis, and propose certification program requirements for HMSS inspector staff. I was responsible to compare the findings of the literature review with the certification proposal. The results, attached in Appendix A, outline a consensus program which will be implemented on January 1, 1998. The program includes 3 general skill areas and 7 specific proficiencies which inspectors must demonstrate in order to receive incentive pay. Recommendations include program implementation by the target deadlines, review of program success by means of performance reviews and surveys of outside agencies, and monitoring of inspector turnover frequency and reasons.

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INTRODUCTION

The problem is that the Orange County Fire Authority (OCFA) for approximately a decade has had difficulty in recruiting and retaining a contingent of trained and competent fire inspectors. During 1998, staffing of the inspector positions, called Fire Safety Specialists (FSS), has at no time reached a full complement of budgeted personnel. FSS positions include four classifications: Senior (or supervising) FSS, FSS II, FSS I, and FSS Trainee (entry level). Two job recruitments for each of the four classifications have been held during 1998, yet the number of qualified applicants has been insufficient to fill the vacancies. One test, for the FSS II position, yielded no qualified applicants. Over the past two years, two inspectors were fired for incompetence, one was demoted, and several are currently under review for failing to deliver at least standard performance. In addition, one inspector quit the OCFA in 1998 in order to accept a higher paying inspector position at a neighboring city.

The FSS staff is part of the bargaining unit of the Orange County Employees Association. As part of the FSSs' 1997 contract, the Orange County Employees Association negotiated approval for a classification study of the FSS positions in the OCFA. Results of the classification study indicated the need to raise salaries for two of the four FSS classifications. The study also proposed to offer incentive pay for achieving certification and working in the specialty sections of Hazardous Materials Services and Planning and Development.

The purpose of this research paper is the identification criteria for certifying FSS staff in the Hazardous Materials Services Section for hazardous materials special assignment pay, which by contract had been established as a 5 % incentive. Using the action research method, the following questions were addressed:

1. What are the particular skill sets required for FSS staff assigned to the hazardous materials section?
2. What classes, training, and/or tests should be required as a demonstration that the FSS has acquired the necessary skills?
3. Should there be a requirement for the FSS to re-certify that they have the particular skills, and if so, what should be required?

By agreement with Orange County Employees Association, OCFA management was required to finalize the classification study by January 1, 1999, with implementation scheduled for July 1, 1999.

BACKGROUND AND SIGNIFICANCE

The Orange County Fire Authority (OCFA) is located in Orange County, California and was established in 1994 as a joint powers authority, having completed a transition from the governance of the County of Orange. Formerly, OCFA was the Orange County Fire Department, and was governed by the five-member Orange County Board of Supervisors. The configuration of the department, comprised of 19 contract cities and the unincorporated communities of Orange County, has remained unchanged since formation of the Authority. Prior to 1980, the fire department was administered by the California Department of Forestry, and responded to increasing population and urbanization by transitioning to a County department. During the 1980s and 1990s, the department has grown due not only to increased population in the County, but also because of the acquisition of additional contract cities. In 1994, three cities joined the department, and four Fire Safety Specialist (FSS) positions were added from the former city departments.

In 1984, the Orange County Fire Department responded to the increasing complexity of both its growing communities and the Uniform Fire Code by converting from sworn to civilian positions in the

Fire Prevention Bureau. Until then, Fire Inspector positions, equivalent in rank to Fire Captain, carried out the fire prevention functions. A department study determined that considerable cost savings could be realized by converting to a civilian work force, obviating the need to pay for safety retirement benefits. The pay scale for the new positions was lower than for Fire Captains, so overall the new inspector positions would reduce costs for both salaries and benefits. In addition, the difficulty of convincing qualified and interested fire suppression staff to transfer to fire prevention assignments was resolved by creating the new technical job classifications of Fire Safety Specialists (FSS). The FSS position was conceived as a career employee who would work exclusively within the job series, developing expertise in the increasingly complex Uniform Fire Code.

Since the first FSS staff was hired in 1985, the department's ability to identify and resolve fire code violations has continued to grow. When suppression personnel staffed the Fire Prevention Bureau on involuntary two- to three-year assignments, the level of commitment to learning and properly applying codes was inadequate. Even a dozen years later, FSS staff continues to identify occupancies that have been in operation for many years with inadequate fire protection systems, inappropriate building classifications, and other significant fire and life safety issues. Fire prevention supervisors and managers continue to hear the complaint, "But I've had fire inspections for years by your department and no one ever told me about this!" Beginning with the 1988 edition of the Uniform Fire Code (UFC, 1998), regulations governing flammable liquids and other hazardous materials became more stringent, with the hazardous materials section growing from six pages in the 1985 UFC to 50 pages in the next edition, the 1988 UFC.

The first group of FSSs hired in the mid-1980s had relatively little experience with the UFC. Due to a paucity of adequate training programs in fire prevention available from local schools, FSSs

have had to learn most of their skills on the job. The first group of supervising FSSs, the Senior Fire Safety Specialists, was promoted from the ranks of the new FSSs with little or no supervisory experience. Consequently, during the first few years of the employment of civilian inspectors, the department experienced problems with hiring decisions, evaluations, staff development, quality control, and other tasks assigned to the Senior FSS staff. Of the initial six Senior FSS personnel, one was fired, one demoted, and the other four remain with the OCFA. Of the latter group, one is now a manager, with the title of Deputy Fire Marshal, and the other three continue as Senior FSSs. Their skills have grown immensely and, with that, the supervision of the FSS staff has also improved.

Appendix B illustrates the current configuration of the fire prevention bureau, now called the Community Safety and Education Department. Table 1 identifies the FSS staff currently assigned to each section. Over the last five years, vacancies and inadequate job performance have been identified in all sections where FSS staff is assigned, with resultant inefficiencies, incomplete work projects, and job terminations. The FSS positions have continued to cost less than the prior Fire Captain inspector positions; as of January 16, 1998, the supervisory fire inspectors were paid at a rate 17% lower than Fire Captains, excluding benefits (*OCFA Personnel and Salary Resolution*, 1998).

Table 1

Fire Safety Specialist Staffing Distribution by Section

Section	Trainee	FSS I	FSS II	Senior FSS
Hazardous Materials Services	0	1	4	1
Inspection Services	0	3	6	3
Planning and Development	0	0	12	2
Total	0	4	22	6

Note. FSS = Fire Safety Specialist. The table displays budgeted positions. At no time during 1997 and 1998 were all positions filled. Hiring at the Trainee rank is an option of management, but is rarely exercised.

During the 1997 contract negotiations between the OCFA and the Orange County Employees Association, which represents the FSSs, an agreement was reached to evaluate the classification and compensation of the FSS positions. OCFA hired Creative Management Solutions, a human resource consultant organization, to conduct the study in the last quarter of 1997, and the completed report was submitted to OCFA by Creative Management Solutions on March 24, 1998 (cite). The scope of the study included evaluation of the organizational structure, job assignments, and qualifications requirements, with the purpose of determining whether the FSS positions "were properly classified and assigned to pay ranges that were internally equitable and generally competitive with market rates" (Creative Management Solutions [CMS], 1998, p.2).

Creative Management Solutions obtained job analysis questionnaires from each FSS staff member who described each job's function, qualifications, minimum level of experience, and special requirements. Supervisors and managers, whose comments were added to the analysis, reviewed the questionnaires. The consultant then interviewed a representative sampling of employees in each classification, supervisors, and their managers. Concurrently, CMS conducted a survey of seven local fire agencies that provide similar fire prevention services as the Authority. The subject agencies were all city fire departments in Orange County, including Anaheim, Costa Mesa, Fullerton, Garden Grove, Newport Beach, Orange, and Santa Ana. The purpose of the survey "was to determine the OCFA's competitive market positioning with respect to established local labor market agencies" (CMS, 1998, p. 1). Managers, CMS staff, Senior FSSs, and Orange County Employees Association representatives met regularly throughout the study to discuss relevant concerns. Table 2, extracted from the CMS report, displays results of the market survey based upon total compensation, including base and premium pay, health and welfare plan contributions, paid time off, and long-term compensation.

The consultant recommended that the FSS job series recognize the variation in the Inspection Services, Hazardous Materials Services, and Planning and Development assignments. Hazardous Materials Services and Planning and Development positions require job knowledge that is more specialized, technical, and for which a higher market demand exists in Orange County. The variation would be achieved by providing a pay premium of 5% for the Hazardous Materials and 7.5% for the Planning and Development positions, providing the employees meet continuing certification requirements to qualify for the premium pay plan. Additionally, the consultant recommended an 8% increase in the salary range of the Senior FSS "to be competitive with prevailing market rates and remedy current pay compaction problems relative to Fire Safety Specialist II classifications" (CMS, 1998, p. 3).

Table 2

Fire Safety Specialist Total Compensation Comparisons

Job Classification	OCFA vs. Market Mean (%) Given Total Comp Comparisons
FSS I (Inspection Services)	-0.96%
FSS I (Hazardous Materials Services)	-0.38%
FSS II (Inspection Services)	+1.78%
FSS II (Hazardous Materials Services)	-9.37%
FSS II (Planning and Development)	-9.09%
Senior FSS (Hazardous Materials Services)	-2.64%
Senior FSS (Planning and Development)	-15.42%

Note. FSS = Fire Safety Specialist. No compensation comparisons are listed for FSS I in Planning and Development and Senior FSS in Inspection Services because these classifications matched less than two benchmark comparisons with the seven other Orange County fire departments in the survey.

In presenting the CMS study to the OCFA Board of Directors on July 1, 1998, the Fire Marshal and Human Resources Manager recommended implementation of the CMS recommendations, and agreed to establish the pay premium certification program by January, 1999, for implementation on July 1, 1999. As Deputy Fire Marshal and manager of the Hazardous Materials Services Section (HMSS), I was assigned responsibility for development of the certification program for the Hazardous Materials component. The study appropriately matches expectations for the Executive Development

course for the National Fire Academy because it will enhance the literature in the field of fire department hazardous materials inspections.

LITERATURE REVIEW

In May of 1977, the National Fire Protection Association (NFPA) produced the first edition of NFPA 1301, *Professional Qualifications for Fire Inspector, Fire Investigator, and Fire Prevention Education Officer*. Produced by a technical committee comprised of fire service professionals from around the nation, NFPA 1301 developed "an interrelated set of performance standards specifically for the uniformed fire service" (NFPA 1301, 1993, p. 1). In June of 1987, NFPA published a new edition of 1301, which included a separate document for the fire inspector job and allowed for civilian entry into the career. The 1993 edition of NFPA 1301, entitled *Standard for Professional Qualifications for Fire Inspector*, outlined criteria for Fire Inspector I, Fire Inspector II, and Fire Inspector III. While these job descriptions correlate with OCFA's FSS I, FSS II, and Senior FSS, the descriptions (*OCFA FSS Job Specifications*, 1998) differ in the highest level position. NFPA's Fire Inspector III is required to have more complex technical skills and knowledge, but the Senior FSS position has the added requirement of supervision of subordinate staff.

Each NFPA 1301 inspector level identified prerequisite skills and knowledge, including some abilities particularly relevant to a hazardous materials specialty assignment. The brief descriptions of hazardous materials tasks derived from NFPA 1301 are summarized in Table 3.

Table 3

NFPA 1301 Prerequisite Skills and Knowledge for Hazardous Materials

Position	Description
Fire Inspector I	Verify code compliance for storage, handling, and use of flammable and combustible liquids; classification, properties, labeling, transportation, storage, handling, and use of flammable and combustible liquids; verify code compliance for the storage, handling, and use of hazardous substances, including fireworks, explosives, compressed and liquefied gases, flammable solids, toxic materials, oxidizers, radioactive materials, corrosive and other regulated materials.
Fire Inspector II	All of the above; also, verify code compliance in processes or operations utilizing hazardous substances or materials.
Fire Inspector III	All of the above; also, evaluate alternative methods for compliance with applicable codes and standards, given a field inspection of a process or operation involving the storage, handling, and use of hazardous materials and substances, so that all deficiencies are noted and addressed, and the operation is protected to a level that is in compliance.

The Appendix of NFPA 1301 further differentiated between the Inspector I and II levels. "The Fire Inspector I is expected to have knowledge of processes and operations that include spray painting and flammable and combustible liquids storage, dispensing, and use," while the "Fire Inspector II is expected to have knowledge of processes and operations that include milling and the manufacture, storage, and use of chemicals and explosives" (NFPA 1301, p. 12).

The State of Illinois developed a pilot program in 1976 that applied the criteria in NFPA 1301 to the training and certification of fire inspectors. The Illinois Fire Inspectors Association, the Illinois Fire Chiefs Association Educational Foundation, and the Office of the Illinois State Fire Marshal further refined the program in 1977. Designed in 13 distinct subject areas which comprised a total of 240 hours of training, the Fire Prevention Inspector I Certification curriculum covered laws and codes, building construction, inspection techniques, hazards, systems and devices, bureau management, and reference sources. An end-of-course examination administered by the State of Illinois required a passing score of at least 70%. As of July of 1985, it was determined that a state certification program was also needed for Fire Prevention Inspector II (Nielsen, 1985, p. 35). Telephone interviews with the Illinois State Fire Marshal's office, and with Deputy Chief Bob Buhs (personal communication, November 30, 1998) of the Orland, Illinois Fire Protection District, revealed that the program had become dated by the mid-1990s. Chief Buhs has been a member of a task force, which developed a new training program for Fire Prevention Officer 1. As of October of 1998, the new curriculum had been presented three times as a pilot project, sponsored through the State Fire Marshal and the Illinois State Fire Chiefs Association. Chief Buhs further indicated that the program had been reduced from 240 hours to three 40-hour modules. Module A contained an orientation, building construction, and systems. Module B concentrated on inspection techniques, hazards and causes, and the Life Safety Code. Public education and investigations were the focus of Module C. The certification also included some fieldwork, calculations, and a 100-question certification exam. No certifications for an Inspector II level had ever been adopted, according to Chief Buhs, but his task group is beginning work on the project.

In 1998, the National Fire Protection Association (NFPA) completed the development of a nationwide program to standardize certification of fire inspectors. As stated in a letter from NFPA President and CEO, George D. Miller to fire marshals on April 22, 1998, " as critical as the job [of fire inspector] is, there was a lack of consistent certification programs available nationally or internationally" (Miller, 1998, April 22). Miller's letter went on to request fire marshals to participate with NFPA as partner agencies in a certification program for Fire Inspector I. The NFPA described parameters based on NFPA 1301 standards and NFPA I (the fire model code promulgated by NFPA). The components of the NFPA certification program included a study guide, a training program which can include either a classroom or self-study approach, a written exam, practicum activities involving seven site visits for which performance checklists must be completed and verified, and a final audit by NFPA. The practicum activities addressed a variety of occupancy types, although none with a specific hazardous materials emphasis. Limitations of the NFPA certification course for OCFA include incompatibility with the Uniform Fire Code, lack of a program beyond the level of Inspector I, and lack of any hazardous materials emphasis. Five-year re-certification is mandatory "to promote continuous professional development and skill maintenance, as well as to provide a mechanism that demonstrates a certified Fire Inspector is always up-to-date in an ever changing field." (Miller, 1998.) To re-certify, a candidate may submit evidence of 100 hours of continuing training related to NFPA 1031 or take a written exam. NFPA applies some of the fees for this program to creating and maintaining a valid test question bank, since "designing and updating examination preparation materials can also be expensive." (Miller, 1998.)

Several other inspection programs have been developed in regulatory fields closely related to fire inspections. In 1973, the International Conference of Building Officials (ICBO) initiated a

Voluntary Certification Program "to encourage professionalism among inspection and plan check personnel through a comprehensive test of their knowledge of codes and practices" ("ICBO Voluntary Certification," 1998, p. 55). In 1988, Building Officials and Code Administrators, International (BOCA) introduced an eight-module Residential Inspector Training Program, addressing the four major disciplines of building, mechanical, plumbing, and electrical ("Comprehensive Inspector Training," 1988). In the State of Washington, officials developed an energy code certification program for plan reviewers and building inspectors (Bowman and Perkerewicz, 1990). "Traditionally, professionals who are certified in their field tend to be more purposeful in doing a good job," Bowman and Perkerewicz noted, referring to "the excellent example of the long-standing certification program offered by ICBO which has done much to elevate the code enforcement profession" (p. 49). The Washington program combined both technical and administrative elements and concluded with a three-hour test of 85 objective questions. The Occupational Safety and Health Administration (OSHA) promulgated inspection guidelines in 1992 for process safety management of highly hazardous chemicals standard, which included audit guidelines. OSHA designated two levels of training for compliance officers, and targeted a limited group of industries by Standard Industrial Code, number of employees on site, facility age, toxicity of chemicals, accident history, and information from local fire departments (OSHA Process Safety Management Audits, 1992). However, fire department personnel were not included in the target audience for the training, which focused on the OSHA process safety management rule, not on fire code issues. Likewise, OSHA training requirements for hazardous materials responders outlined four levels of competencies, but none were particularly applicable to fire inspectors (Donahue, 1993, and Curmode, 1990).

Performance standards have been the focus of greater attention in the 1990s, with the fire service "experiencing more political and legal pressures in the area of accountability, specifically regarding training and safety" (Davis, p. 56). Davis documented the value of properly designed performance standards for achieving minimum performance levels of both skills (psychomotor) and knowledge (cognitive), but with an emphasis on fire fighter professional qualifications. In 1992, the U.S. Bureau of Labor Statistics published a report, *Protective Service Occupations and Compliance Inspectors*, but its focus was fire prevention training for career firefighters.

Several recent articles documented an interest in certification and professional standards for various hazardous materials and hazardous waste specialties, particularly in program management. Pompili (1995, p. 11) stated, "The federal government will have a very important strategic role" in

ional and technical resources to other government entities." Writing in the Journal of Environmental Health, check Johnson and Bear stated, "The United States remains the only major industrialized nation that is without standards to define the skills required for industrial occupations" (Johnson and Bear, 1995, p. 23). They cited the Clinton administration's program, "Goals 2000: Educate America," as an initiative designed to assist schools in developing courses of study which will prepare knowledgeable technicians for the needs of industry. The initiative included the development of a skills standard commissioned by the federal government to address Hazardous Materials Management Technicians. However, the project did not include within its scope the development of a certification process for the skill standards. In April 1996, University of Nevada, Las Vegas researchers summarized a course of study designed for hazardous materials management. Three courses were developed for the University of Nevada, with the goal of addressing the needs of two distinct clientele: degree-seeking students and personnel already in the work force. The courses

included Environmental Toxicology and Risk Management, Environmental Regulations, and Sampling, Analysis, Treatment and Disposal (Tirri, Manning, and Johnson, 1996).

PROCEDURES

I conducted a literature review at the National Fire Academy's Learning Resource Center, at the Main and Science libraries of the University of California at Irvine, on the Internet, and in the archives and records of the Orange County Fire Authority. Additional telephone interviews were conducted to update some of the materials from the literature review.

The literature review concentrated on whether and how other fire agencies had developed and implemented a certification program for hazardous materials inspectors. Due to a limited number of published references about certification programs for fire inspectors in general and hazardous materials inspectors in particular, the scope of the research extended back to ten years and included information about certification programs for building inspectors, also. Newer literature which addressed technicians in hazardous materials management fields was also incorporated into the review, since many of the topics were analogous to subjects which are of relevance to hazardous materials fire inspectors. For example, sciences such as chemistry and biology apply to many kinds of hazardous materials technical jobs. In addition, general administrative skills are necessary in public sector technical jobs, especially ones, which involve significant interaction with the public, and with other regulatory agencies. As noted by Johnson and Bear, "all technicians need foundational skills related to communications, mathematics, science, logical reasoning, and interpersonal relations." (Johnson and Bear, 1995, p. 24.)

Within the Orange County Fire Authority, the team, which worked on the job classification study, was tasked with development of the specialty certification program. The work of the team was

facilitated by an Administrative Analyst, who prepared the project timeline and formalized the notes from each meeting. Other team members included the Deputy Fire Marshal for the Planning and Development Section, two Senior FSSs from that section, the Deputy Fire Marshal (this writer) from the Hazardous Materials Services Section (HMSS), a Senior FSS from HMSS, an Administrative Analyst representing the Human Resources Section, and a FSS II representing the Orange County Employees Association. By agreement between the Orange County Employees Association and OCFA management, the team had to complete the program design by January 1, 1999, for implementation by July 1, 1999 to allow incumbents six months to complete necessary training courses. The team met every two to three weeks between July and December 1998. The final draft certification proposal (Appendix A) was submitted to the Fire Marshal and the Human Resources Manager in November 1998.

Since I have managed the HMSS for over eight years, the Fire Marshal designated me as project manager for the hazardous materials component. I reviewed the new job specifications to identify the tasks which are unique to Fire Safety Specialists who are assigned to HMSS. Next, in conjunction with the team, I delineated several subject areas, which addressed the unique job tasks in HMSS. From the list of subject areas, we reviewed course catalogues from most of the local community and four-year colleges and universities. Our review included undergraduate, graduate, and extension courses. We also assessed training certificate programs available through the State Fire Marshal, the International Conference of Building Officials, the California Specialized Training Institute, the National Fire Academy, and the Public Services Institute. Recognizing that many courses offered by local schools were essentially equivalent to courses offered at many institutions around the country, we developed statements of equivalency for most of the skill areas.

I compared our findings with the literature review that I had completed. A limitation of this study includes the lack of documentation of equivalent hazardous materials inspector research and programs, as noted above. The lack of a single fire code creates the need for state and local agencies to address inspection standards which respond to local codes, employing unique criteria. Four major fire codes are currently used in the United States: the Uniform Fire Code (UFC, used throughout California and most of the western United States), BOCA, Southern Building Code Congress International (SBCCI), and NFPA 1. To further increase the complexity, local jurisdictions in California retain the right to pass local ordinances for more stringent fire code requirements, and all twenty of the OCFA jurisdictions exercise this right. Consequently, fire code requirements differ not only throughout California, but also within the cities regulated by our own fire department. Clearly, no single training or standards institution, even NFPA, can address such a wide variety of regulations, and much of the training of an OCFA fire inspector must be addressed on the job.

RESULTS

Appendix A, FSS Certification Program for the Hazardous Materials Services Section, outlines the job task analysis, criteria for credit, program requirements, and certification maintenance requirements. The OCFA team endeavored to make the specialty pay certification criteria and format compatible between both the Hazardous Materials and the Planning and Development components, for ease of administration. The two components contained similarities in the subject areas of communications, computer skills, office skills, and research methods. The team also developed the same criterion to be used for certification maintenance in both components.

One topic of debate was whether an inspector newly transferred to HMSS or Planning and Development should be required to serve a “waiting period” while learning the new assignment. In that

event, the inspector may have met all the certification criteria, but would not receive the pay incentive while they were learning their new assignment. The Fire Safety Specialists on the team objected strongly to this proposal. They stated that the Creative Management Solutions survey identified that HMSS and Planning and Development Fire Safety Specialists are paid less than equivalent inspectors are in other Orange County fire departments. The team ultimately recommended not to require a waiting period, but to award the pay incentive to any FSS assigned to the sections who met all certification requirements. The Fire Marshal accepted this recommendation.

Using Appendix A, the research questions posed for this paper can be reviewed.

1. What are the particular skill sets required for FSS staff assigned to the hazardous materials section?

Section I of Appendix A contains the Job Task Analysis, which excerpts from the FSS job specifications the requirements that pertain to the HMSS assignment. The requirements are identified by the separate FSS job classifications that are eligible to the specialty incentive pay (Senior FSS, FSS II, and FSS I). Since all team members had participated with the Creative Management Solutions consulting group in the research to develop the job specifications, we had confidence in the accuracy with which those specifications described the current FSS jobs.

2. What classes, training, and/or tests should be required as a demonstration that the FSS has acquired the necessary skills?

Section III of Appendix A outlines three general skill areas: Communication, Technical Skills, and Hazardous Materials Codes. Various means can be used to meet the seven specific criteria in the three general skill areas, in order to recognize the many ways in which particular technical skills can be

acquired. The experience of all members of the team was utilized to identify the variety of backgrounds that can contribute to effectiveness in the Hazardous Materials Services Section.

On the direction of the Fire Marshal, the team tried to avoid certification requirements, which would be difficult to administer. For example, a test in hazardous materials subjects would be an objective means to demonstrate knowledge in areas such as chemical classification, basic chemistry, conversion of quantities (for example, from pounds to cubic feet of a gas), and special fire code requirements. The literature review had identified model programs which have a test process (Miller letter, 1998, and Buhs, 1993). However, the OCFA Human Resources Section does not maintain resources for developing and administering a test process, which would need to be updated regularly to ensure currency and fairness. No research was completed to determine whether a testing service might provide sample questions. However, the special regulations in local fire codes might preclude use of any one pre-packaged test, even if one were available for purchase.

The team engaged in considerable debate over how to apply college degrees to the general knowledge requirements such as communications and research skills. Should a college degree in astronomy or history be considered valuable for a hazardous materials fire inspector and if so, on what basis? Ultimately, the team returned to the required skill sets, determined which of them would be enhanced by college work, and identified additional methods for achieving competencies. One example of how the team used this process is computer skills. College classes in Cobol or Fortran programming might lead to a degree in computer sciences. However, the software used at OCFA is all based on personal computers and is comprised of new, user friendly applications. On the job, many of our most competent automated systems users are self-taught. Therefore, the team selected a broad variety of means by which staff can demonstrate computer proficiency, including demonstration on the job.

3. Should there be a requirement for the FSS to re-certify that they have the particular skills, and if so, what should be required?

As noted above, the team chose to make certification requirements for both the HMSS and Planning and Development sections as similar as possible. Originally, some team members proposed that no re-certification requirements should be imposed, since continuing to work on the assignment would ensure ongoing competency. Other team members wanted an annual requirement of 100 training hours. Ultimately, the team compromised with a proposal for 40 hours of annual training. The hazardous materials certification can be maintained by 40 hours of training in the areas of chemistry, regulations, advanced codes, the Federal Clean Air Act Risk Management Program, process hazards analysis, emergency planning, risk analysis, or equivalency. The criteria were left deliberately broad, in part to recognize the changing nature of technical knowledge and regulations in the hazardous materials field.

Eligibility for certification based on Appendix A will be decided by the immediate supervisor of the candidate or, in the case of a dispute, by the program manager (Deputy Fire Marshal).

The program has not yet been formally distributed for review, but the Fire Safety Specialists and Orange County Employees Association representatives who served on the implementation team have indicated their support for the proposal. The Executive Management position is represented by the Fire Marshal, who has approved the draft program. An implementation meeting will be held in December of 1998, at which time the proposal will be presented to all staff. Because no additional Board of Directors approval process is required, the proposal will be implemented as written on January 1, 1999.

DISCUSSION

The hazardous materials certification proposal contains practical, relevant, and attainable criteria that will help to increase the proficiency of fire inspector staff in HMSS. Because it is a consensus document developed by management, supervisor, and technical staff, and reviewed by the Executive Management team, it is expected to be received positively by OCFA staff. The development team met all proposed deadlines, allowing FSS staff six months to begin their studies in any areas of learning which they lack. The certification process will not be labor intensive to administer the program, which was one of the key objectives of the Fire Marshal.

The similarity of the OCFA general criteria to programs promulgated by such organizations as the University of Nevada, the National Fire Protection Association, and the Illinois State Fire Marshal (Tirri and Manning, 1996; Miller, 1998; and Buhs, 1993) helps validate the relevancy of the OCFA proposal. Of particular value for comparison was NFPA Standard 1301, because it is a broadly researched document that tracks closely with the skill sets that we identified in our review of the OCFA job specifications. OCFA had just completed the adoption of new job specifications for the inspector positions, and the same team members who worked on the classifications also developed the certification criteria.

The information obtained from the Illinois State inspector certification pilot project (Buhs, 1993), based on NFPA 1301, replicated several of the fire inspector skill areas we identified. These similar skill areas include office skills like record keeping, report writing, and document retention; regulations such as hazardous materials Community-Right-to-Know and fire code; emergency plans; behavior of hazardous materials; communications issues such as interviewing, non-verbal communication, and presentations. Likewise, we found consistency between the classes we identified

and those proposed for other hazardous materials technical professionals (Powitz, McMicking, and Kummler, 1990; Tirri, Manning, and Johnson, 1996).

While the OCFA, with the advice of competent consultants, has chosen to implement the specialty certification and pay incentive program with the objective of hiring and retaining competent FSS staff, a successful outcome has not been demonstrated yet. The greatest limitation in determining the success of the study and recommendations is that the certification program will not be implemented until mid-1999, and results will not be documented for six months to a year after that time. The program will need to be monitored, along with improved departmental monitoring of turnover rates, recruitment processes, and quality of customer service. For long-term evaluation, salaries within OCFA will need to be compared again to other Orange County fire departments to determine whether our compensation is outpaced again.

RECOMMENDATIONS

1. Present the certification program to all department staff January 1, 1999, for implementation of incentive pay for qualified candidates beginning on July 1, 1999.

2. Establish a record-keeping system to document the certification of each FSS staff member. Existing automated and manual record keeping systems will need to be reviewed and modified.

3. Supervisors should meet with each staff member to review eligibility, and work with staff to prepare a staff development plan for those interested in applying for certification.

4. The Deputy Fire Marshal for HMSS should work with the Human Resources Manager to establish a system for documenting turnover of FSS staff, including exit interviews for all FSS staff who

leave OCFA employment. The reasons for turnover should be evaluated annually by the Fire Marshal and Human Resources Manager.

5. Once the new certification program is in place, the Deputy Fire Marshal should work with Human Resources and the Senior FSS in the Hazardous Materials Services Section to review accuracy rates and service levels. Accuracy and service provision should then be compared to benchmarks established before program implementation, to validate whether the certification is having a positive impact upon customer service.

6. The Human Resources Section should conduct a compensation survey of other fire departments in two to three years, to determine whether OCFA's FSS salaries remain competitive.

Future readers considering the development of a certification program for hazardous materials fire inspectors should begin by analyzing turnover rates and accuracy of current inspector performance. Evaluate existing training programs in the local community. If local academies or other educational institutions provide relevant training, which is specific to inspectors' needs, consideration should be given to using those programs already established. Departments with sufficient resources should consider administration of an objective test for certification of specialties such as hazardous materials, but the test should be updated with every use to insure fairness. Once the International Fire Code is in place, consideration should be given to development of national, or even international, standards for fire inspector performance and certification. Achieving the consistency of an international code document could only be enhanced by the development of standards for implementation of the code on a broad basis.

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Appendix A

FSS CERTIFICATION PROGRAM
HAZARDOUS MATERIALS SERVICES SECTION

I. Job Task Analysis: The job specifications for Senior FSS, FSS I, and FSS II include the following requirements which are specific to the Hazardous Materials Services Section:

- **Senior FSS**: Enforce mandates and standards re. haz mat processes, storage, and usage; supervise the verification and approval of haz mat inventories and BEPs, and assignment of appropriate fee billing codes; coordinate complex haz mat team inspections with personnel from other sections, HCA, and other environmental enforcement agencies; oversee resolution of billing complaints in coordination with Financial Services and HCA staff; *review the classification of chemicals by FSS and Engineer staff**;** coordinate with Engineer staff, consultants, and facilities' technical staff in assessment of process hazards analysis as related to RMP and the UFC; review and update haz mat area plan documents.* (Items in italics are not in specification but are requirements for the job.)

- **FSS II**: Inspect haz mats, BEPs, and chemical inventories; verify chemical inventories for classification in accordance with UFC and 6.95 of H&S Code; inspect and test haz mat drainage and containment systems, chemical storage and use areas, medical gas systems and related processes involving chemicals, for compliance with applicable codes and ordinance; investigate and resolve major technical and policy compliance issues, including conformity of RMPs with the requirements of the UFC; analyze occupancies for haz mat non-compliance from historical records, and coordinate the development of comprehensive fire safety studies and compliance plans incorporating historical codes and alternative means and methods; incorporate UFC upgrades with RMP and hazardous waste compliance; write and update haz mat area plan documents.

- **FSS I: Conduct** verification inspections of haz mat inventory and BEPs; review chemical classifications, disclosure documents, and BEPs; assign appropriate HMSS billing codes and prepare data entry documents; prepare updated materials for haz mat area plans.

II. Criteria for Credit

- All certification/course requirements must be verified with a certificate or with verification, such as a transcript, of a passing score of C or better. Examples of qualifying classes are offered for information only and are not intended to provide an exhaustive list or eliminate similar classes from being used for credit.
- Equivalencies may be substituted for most criteria. The burden of proof is on the candidate; the supervisor recommends approval or denial; the section manager makes the final decision.

- In lieu of required coursework, proficiency may be demonstrated for most criteria. *Proficiency* is defined as *competent and capable or adept at completing a specific task or skill*. Examples of acceptable proficiencies are listed with each skill category.

III. Program Requirements

Program Requirements: Overview

1. Written communications: College degree, or 40 hours of qualifying coursework, or demonstrated proficiency

2. Oral communications: Teaching credential, or SFM Instructor 1A & 1B, or 40 hours of qualifying coursework,
or demonstrated proficiency

3. Computer skills: Demonstrated proficiency

4. Office and Research skills/methods: 40 hours of qualifying coursework or AA/AS degree or higher

5. Science, Chemistry: Certifications or 40 hours of qualifying coursework

6. Regulations: Certification or approved courses

7. Hazardous Materials Code: Approved courses

Note: 40 hours is generally considered to be a 3-unit college-level course under either the semester of quarter system.

A. Specialized Office/Organizational Skills

1. Communication

Written: College degree, 40 hours of qualifying coursework, or demonstrated proficiency

Courses: Examples of Qualifying

- Basics of Effective Writing
- Writing Effective Reports
- Technical writing
- English Composition
- Critical Thinking and Writing
- Business Writing

Proficiency: The employee must provide a written document to the supervisor based upon a work-related subject defined by the supervisor. The document must be at 300 words in length, but not longer than 500 words (equivalent of 2 to 3 type written pages). The paper will be determined to be passing or not passing based on

conformance to requirements in length, structure and organization; and the use of satisfactory vocabulary, grammar, spelling, and standard report writing skills

Oral: Teaching credential, SFM 1A & 1B, 40 hours of qualifying coursework, or demonstrated proficiency

Examples of Qualifying Courses:

- PSI Presentation Skills
- CSFM Instructor 1A and 1B (required for SFSS)
- Speech Communication

Proficiency: Demonstrated through formal presentations on the job.

Computers: Demonstrated proficiency only

Proficiency: Demonstrated proficiency with applications required for the assignment. Examples include:

- Microsoft Outlook (using e-mail)
- Microsoft Outlook (using the calendar)
- Microsoft Word (word processing)
- Chemical data bases
- IFPIII (using the system). Must show familiarity with all screens used in the Hazardous Materials Service Section.

2. **Office and Research skills/methods: 40 hours of qualifying coursework, or AA/AS degree** or higher in any subject matter from an accredited institution

Examples of Qualifying Courses:

- Research Methodology courses
- Cerritos VA-83 Management: Department Operations
- SDLB Library Research 100
- RSCC Business Application 018: Office Procedures
- CSFM Fire Management 2E
- RSCC Business 120: Principles of Management

NOTE: Course work must include at least one course requiring research.

Up to 24 hours of the 40 hours may be obtained through PSI courses which involve principles of business skills. Examples of qualifying PSI courses:

- Managing Change
- Organizing Files and Records
- Time Management
- Preparing for Supervision
- Problem Solving/Decision Making
- Understanding Personal Workstyles

Other PSI classes may also qualify but are subject to prior approval.

Proficiency: N/A

B. Technical Skills/Knowledge

1. **Science, Chemistry: NFA 80-hour chemistry course, or CSTI Chemistry of Haz Mat Certification, or 40 hours of qualifying coursework**

Examples of Qualifying Courses:

- UCI chemistry
- Haz Mat 1A

2. Regulations: Certification or approved courses

Examples of Qualifying Courses:

- UCI Regulatory Framework for Hazardous Materials or equivalent overview course on the many haz mat regulations and statutes
- UCI Environmental Law and Principles of Occupational Safety and Environmental Health (both courses), or equivalent

Examples of Certifications:

- Registered Environmental Assessor certification
- UCI Haz Mat Management certification or equivalent

C. Hazardous Materials Code: Approved courses

- IFCI Article 79 and 80
- Equivalency
- Building Design for Haz Mats

IV. Certification Maintenance: To retain the HMSS Certification, the FSS will need to complete 40 hours in training annually, which must specialize in the chemistry, regulatory, or advanced code areas. Additional areas which will achieve recertification credit include RMP, process hazards analysis, emergency planning, risk analysis, or equivalency. The FSS is responsible for completing and documenting training according to the criteria listed above.

40 hours per year in relevant coursework.

Proficiency: N/A

Legend: Agency/College Abbreviations

CSFM	California State Fire Marshal
CSTI	California Specialized Training Institute (OES)
IFCI	International Fire Code Institute
NFA	National Fire Academy
PSI	Public Service Institute (County of Orange)
RSCC	Rancho Santiago Community College
SDLB	Saddleback Community College

UCI	University of California, Irvine
BEP	Business Emergency Plan
RMP	Risk Management Plan

Appendix B

Orange County Fire Authority Community Safety and Education Department

Fire Prevention Staff

November 1998

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(714) 289-7419

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Deputy Fire Marshal
(714) 744-0485
Secretary - Lois McFeaters
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Executive Support
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Staff Analyst III
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Advance Planning
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Battalion Chief
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Office Specialist - Lydia Slivkoff
(714) 289-6522
Office Supervisor - W. Blumberg

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@ Irvine City Hall, Karen Blackwell: (949) 724-6355
@Irvine City Hall, Carrie Mack: (949) 724-6344
La Palma, Dan Blystone: (714) 744-6629
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Placentia, Fred Stoll: (714) 744-0475
Seal Beach, Fred Stoll: (714) 744-0475
Stanton, Bret Anderson: (714) 744-0498
Tustin, Doug Hartman: (714) 744-6676

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Plan Review

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Laguna Niguel, Dave Oatis: (714) 744-0477
Lake Forest, Diedre Wood: (714) 744-0474
Mission Viejo, Andy Spada: (714) 744-0501

Hazardous Materials Services Section
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Deputy Fire Marshal
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Secretary - Pat Hall
(714) 744-0463

Hazardous Material Services Staff

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FSS I, Brett Davidson: (714) 744-6696
FSS I, Dennis Hirschberg: (714) 744-0419
FSS I, Rhonda Jones: (714) 744-6674
Chemist, vacant: (714) 744-0469

Prevention Support

Supervisor, Kathy Ballantyne: (714) 744-0523
Fire Safety Specialist, Judy Hutain: (714) 744-0577
Fire Capt, vacant
Office Spec., Marilee Freville: (714) 744-0406
Office Tech, Veronica Gastelum: (714) 744-0481

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Fuel Modification, David Oatis: (714) 744-0477

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Stanton, Westminster and Unincorporated Communities
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Supervisor, Dianne Parker
Office Specialist, Judy Pruett
Inspectors: Elaine Dees, Ton Dzien, Bill Hart,

Division II
Irvine, Placentia, Tustin, Villa Park, Yorba Linda Unincorporated Communities
(949) 559-7537

Supervisor, Steve Cobb
Office Specialist, Luci Mello
Inspectors: Michelle Herian, Dave Montgomery

Division III
Dana Point, Laguna Hills, Laguna Niguel, Lake Forest, Mission Viejo, San Clemente, Unincorporated Communities
(949) 362-4710

Supervisor: vacant
Office Specialist, Brenda Best
Inspectors: Darren Johnson, Stacy Lambeth, Barbara Meiner